180455

# First Five-Year Review Report

## for

## Powell Road Landfill Site

## Huber Heights

## Montgomery County, Ohio

## August 2003

**PREPARED BY:**

**United States Environmental Protection Agency, Region 5**

**Ohio Environmental Protection Agency, Southwest District Office**

Approved by:

Wm. E. Muno

William E. Muno, Director
Superfund Division

Date:

8/5/03

**Powell Road Landfill Site**
**Huber Heights, Ohio**
**First Five-Year Review Report**

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## Executive Summary

The remedy for the Powell Road Landfill Site in Montgomery County, Ohio included an improved landfill cap, excavation of contaminated soils and placement on the landfill under the new cap, an active landfill gas collection and destruction system, leachate extraction and collection, flood protection and storm water controls, groundwater monitoring, fencing and institutional controls. The site achieved construction completion with the signing of the Preliminary Close Out Report on February 25, 2000. The trigger for this five-year review was the start date of the remedial action in October 1998.

The assessment of this five-year review found that the remedy was constructed in accordance with the requirements of the Record of Decision (ROD). The remedy is functioning as designed and the immediate threats have been addressed. The groundwater study required by the United States Environmental Protection Agency (EPA) to evaluate whether the deferred groundwater extraction and treatment components of the remedy are necessary has been completed. The results of this study indicate that volatile organic compound concentrations in the shallow zone groundwater and in the primary aquifer continue to decrease, and that aerobic and anaerobic biodegradation is occurring. Therefore, there is no indication that the groundwater extraction and treatment components of the remedy will be necessary.

# Five-Year Review Summary Form

| SITE IDENTIFICATION | | |
|---|---|---|
| **Site name** *(from WasteLAN)*: Powell Road Landfill | | |
| **EPA ID** *(from WasteLAN)*: OHD000382663 | | |
| **Region:** 5 | **State:** Ohio | **City/County:** Huber Heights/Montgomery |

| SITE STATUS | |
|---|---|
| **NPL status:** ☒ Final ☐ Deleted ☐ Other (specify) _____ | |
| **Remediation status** (choose all that apply): ☐ Under Construction ☒ Operating ☐ Complete | |
| **Multiple OUs?*** ☐ YES ☒ NO | **Construction completion date:** 02/25/2000 |
| **Has site been put into reuse?** ☐ YES ☒ NO | |

| REVIEW STATUS | |
|---|---|
| **Lead agency:** ☐ EPA ☒ State ☐ Tribe ☐ Other Federal Agency _____ | |
| **Author name:** Scott Glum | |
| **Author title:** Site Coordinator | **Author affiliation:** Ohio EPA, Southwest District |
| **Review period:** 03/10/2003 to Signature Date of this five-year review | |
| **Date(s) of site inspection:** 06/30/2003 | |

**Type of review:**

☒ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only
☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead
☐ Regional Discretion

**Review number:** ☒ 1 (first) ☐ 2 (second) ☐ 3 (third) ☐ Other (specify) _____

**Triggering action:**

☒ Actual RA Onsite Construction at OU # n/a ☐ Actual RA Start at OU#____
☐ Construction Completion ☐ Previous Five-Year Review Report
☐ Other (specify) _____

**Triggering action date** *(from WasteLAN)*: 10/01/1998

**Due date** *(five years after triggering action date)*: 10/01/2003

* ["OU" refers to operable unit.]
** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

## Five-Year Review Summary Form, cont'd.

**Issues:**

According to the data reviewed and the site inspection, the remedy is functioning as intended. No significant issues were identified.

**Recommendations and Follow-up Actions:**

The recommendation resulting from this five-year review is to continue operation and maintenance of the current remedy components. Based upon the results of the Ground-Water Study, there is no indication that the groundwater extraction and treatment components of the remedy will be necessary. O&M groundwater monitoring should continue. It is recommended that discussions between Waste Management and TriCities North Regional Wastewater Authority continue regarding discharge of leachate to the WWTP for treatment. This would be more efficient than the current practice of having leachate hauled by tanker truck to an off-site treatment facility. The excessive vegetation identified during the site inspection will be removed by Waste Management, and these areas will continue to be inspected for excessive vegetation.

**Protectiveness Statement(s):**

The site remedy is protective of human health and the environment. The remedy eliminates the principal threat posed by the Site by preventing direct contact with contaminated materials, venting and destroying landfill gases, greatly reducing water flow thru the waste, and extracting and treating leachate from the landfill. Long term protectiveness of the remedy will be verified through continued groundwater monitoring.

**Other Comments:**

None

**Powell Road Landfill Site**
**Moraine, Ohio**
**First Five-Year Review Report**

## I. Introduction

The purpose of the five-year review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports. In addition, five-year review reports identify issues found during the review, if any, and recommendations to address them.

The Agency is preparing this five-year review pursuant to Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) §121 and the National Contingency Plan (NCP). CERCLA §121 states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The agency interpreted this requirement further in the National Contingency Plan (NCP); 40 CFR §300.430(f)(4)(ii) states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

The Ohio Environmental Protection Agency (Ohio EPA), Southwest District Office, and United States Environmental Protection Agency (EPA), Region 5, conducted this five-year review of the remedial action implemented at the Powell Road Landfill site in Huber Heights, Ohio. This review was conducted from March 2003 through July 2003. This report documents the results of the review.

This is the first five-year review for the Powell Road Landfill site. This statutory five-year review is required due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure.

## II. Site Chronology

The chronology of events for the Powell Road Landfill site is listed in Table 1.

**Table 1: Chronology of Site Events**

| Event | Date |
|---|---|
| Site operated as a landfill | **1959 to 1984** |
| Site proposed for listing on the National Priorities List (NPL) | **September 8, 1983** |
| Site included on the NPL | **September 21, 1984** |
| Administrative Order of Consent (AOC) signed between potentially responsible parties (PRPs), EPA, and Ohio EPA to conduct a Remedial Investigation/Feasibility Study | **November 12, 1987** |
| Remedial Investigation conducted | **1986 to 1992** |
| Feasibility Study conducted | **1992 to 1993** |
| Record of Decision (ROD) signature | **September 30, 1993** |
| AOC signed between PRPs, EPA, and Ohio EPA to perform the Remedial Design | **June 13, 1994** |
| Groundwater Explanation of Significant Differences (ESD) issued | **January 23, 1997** |
| Leachate ESD issued | **August 13, 1997** |
| Remedial design completed and approved | **December 5, 1997** |
| Unilateral Administrative Orders (UAOs) issued by EPA for Remedial Action and for design and implementation of the groundwater extraction and treatment system | **May 6, 1998** |
| Remedial Action construction initiated | **October 1998** |
| EPA and Ohio EPA conducted pre-final inspection, which concluded that all construction activities were complete | **January 27, 2000** |
| EPA instructs PRPs to perform Ground-Water Study | **February 2000** |
| EPA signs Preliminary Close-Out Report | **February 25, 2000** |
| Report of Ground-Water Study submitted to EPA | **January 2003** |
| Five-Year Review Site Inspection conducted | **June 30, 2003** |

## III. Background

### Physical Characteristics

The Powell Road Landfill Site (the Site) site is located in Huber Heights, Ohio, a suburb in the northern part of the Dayton metropolitan area, Montgomery County, Ohio. A location map is provided in Figure 1. The Site occupies approximately 70 acres on the floodplain of the Great Miami River. The landfill portion of the Site is located at 4060 Powell Road, Huber Heights, Ohio, and is bordered on the north by Powell Road and one former residential home currently owned by Waste Management of Ohio, Inc. (WMO), on the east by an intermittent stream that flows south to the Great Miami River, on the south by a wooded area within the floodplain of the Great Miami River, and on the west by Rip Rap Road. The generally south flowing Great Miami River flows west to east along the southern boundary of the Site. The landfill area used for waste disposal is estimated at 36.3 acres and rises 30 to 40 feet above the surrounding terrain. The base of the landfill extends about 15 feet below original grade.

### Land and Resource Use

The Site lies within the Till Plains section of the Central Lowland physiographic province in an area characterized by low topographic relief resulting from the leveling actions of various glacial processes. The local topography is a generally level upland area dissected by the valley of the Great Miami River and its tributaries. The Site is situated on the floodplain of the Great Miami River, which flows west to east along the southern boundary.

The Site is located within the Great Miami River buried valley aquifer system, which has been designated by the EPA as a sole-source aquifer. The Site area is underlain by as much as 200 feet of unconsolidated glacial deposits of sand and gravel, till, and lacustrine clays. At some locations in the valley, the aquifer is divided into upper and lower aquifers by a low permeability till layer. The aquifer is the water supply source for the Dayton metropolitan area. Huber Heights and the city of Dayton currently operate well fields within 0.75 and 1.5 miles south of the site, respectively. Residents of the Eldorado Plat subdivision to the south of the site obtain water from private wells installed in the aquifer.

Current land uses that border the Site include residential, commercial/industrial, agricultural, and wooded/brush. The property surrounding the Site is zoned for agriculture, single-family residential, conservation, well head operation district, general industry, and floodplain.

### History of Contamination

The Site is a former gravel pit that operated as a landfill from 1959 to 1984 under several different owners. During landfilling operations the Site received commercial, industrial, and nonhazardous municipal wastes from a number of different sources. Improper disposal of certain types of liquid and industrial waste is also believed to have occurred. The landfill was originally owned and operated by Mr. Frank Barger from 1959 to 1973. Landfill Systems, Inc. took control of the property in 1973 and was subsequently purchased by SCA Services of Ohio,

Inc. in 1978. Waste Management of Ohio, Inc. (WMO) acquired the landfill in 1984 when it purchased SCA. The landfill ceased operation upon transfer to WMO and was capped and seeded in 1985.

In 1984, the Site became a suspected source of groundwater contamination based on sampling results from residential and public water supply wells located downgradient of the Site. These wells, located near Needmore Road to the south of the site, exhibited detections of volatile organic compounds (VOCs). Concern over potential contamination from the Site, the possible presence of strontium chromate and benzidine in the sludges and inks disposed at the Site, and its proximity to the City of Dayton and Ohio Suburban Water Company well fields led to the site being listed on the National Priorities List (NPL).

## Initial Response

The Site was proposed for listing on the NPL on September 8, 1983 and was final on the NPL on September 21, 1984. The Site ceased operation upon transfer to WMO in 1984. In 1985, the Site was permanently closed and was subsequently capped with 12 to 69 inches of sandy silt borrow material and seeded.

## Basis for Taking Action

On November 12, 1987, EPA, Ohio EPA, and SCA of Ohio entered into an Administrative Order of Consent (AOC) which required SCA of Ohio to conduct a Remedial Investigation/Feasibility Study (RI/FS) and pay all oversight and all past costs associated with the site. The purpose of the RI was to determine the nature and extent of contamination and estimate the risks posed by the Site to human health and the environment. Contamination identified during the RI included the following:

Landfill gases consisting of methane with detectable concentrations of VOCs such as vinyl chloride, tetrachloroethene, 1,1-dichloroethane, 1,2-dichloroethane, benzene, chlorobenzene, ethyl benzene, xylene and toluene.

Landfill leachate containing relatively high concentrations of VOCs such as vinyl chloride, tetrachloroethene, 1,1-dichloroethane, 1,2-dichloroethane, benzene, chlorobenzene, ethyl benzene, xylene and toluene, SVOCs such as phenol, dichlorobenzene, methyl phenol, nitrobenzene, dibenzofuran, and inorganic compounds such as lead, chromium, mercury, cadmium and arsenic.

Surface and near-surface soils containing SVOCs such as benzo(a)pyrene, chrysene, benzo(b,k)fluoranthene, pesticides such as DDT and polychlorinated biphenyls (PCBs - Aroclor 1016, 1254).

Shallow and primary aquifers adjacent to the landfill containing VOCs such as 1,1-dichloroethane, 1,2-dichloroethene, 1,1,1-trichloroethane, trichloroethene and vinyl chloride.

Residential wells screened in the primary aquifer south of the Great Miami River (Needmore Road area) downgradient of the site having detections of VOCs at low concentrations. A connection between the Site and contamination found in the Needmore Road area could not be confirmed and is therefore not addressed by the final remedial action.

## IV. Remedial Actions

### Remedy Selection

The components of the remedy as specified in the Record of Decision (ROD) dated September 30, 1993, Explanation of Significant Difference (ESD) dated January 23, 1997 and ESD dated August 13, 1997 are:

1. Institutional controls including site security, deed restriction, and access control.
2. Flood protection including but not limited to seeding and mulching unvegetated areas, maintaining temporary control measures, and protecting existing vegetation.
3. Storm water controls including berms, discharge ditches, etc. to dissipate the energy of the storm water flow and reduce erosion potential.
4. An improved landfill cap consisting of a low permeability layer, a drainage layer, a geotextile layer, and vegetative soil layer.
5. Excavation of contaminated soils and consolidation of soils under the improved landfill cap.
6. A leachate extraction and collection system consisting of series of vertical extraction wells installed in the landfilled waste designed to extract leachate in order to prevent its migration out of the landfilled waste.
7. A ground water extraction system to capture contaminated ground water from the shallow aquifer adjacent to the landfill and on-site treatment (the ground water component is contingent per the January 1997 ESD)
8. Off-site treatment of extracted leachate (per the August 1997 ESD)
9. Active landfill gas collection and treatment with a flare.
10. Discharge of treated groundwater and leachate to river in accordance with NPDES requirements.
11. Monitoring systems for groundwater, air, points of compliance, and the extraction/treatment/discharge systems, in order to determine the effectiveness of the remedial actions.

The selected remedy eliminates the principal threat posed by the Site by preventing direct contact with contaminated materials, venting and destroying landfill gases, greatly reducing water flow thru the waste, and extracting and treating leachate from the landfill.

### Remedy Implementation

On June 13, 1994, an AOC was signed between the potentially responsible parties (PRPs), EPA, and Ohio EPA to prepare the Remedial Design (RD) for the selected remedy. The RD was completed and approved in December 1997. However, EPA issued two ESDs explaining changes to the remedy which occurred during the design phase.

On January 23, 1997, EPA issued the Groundwater ESD modifying the remedy selected in the ROD by postponing design and construction of the groundwater extraction and treatment system portions of the remedy until a groundwater study was conducted. The second ESD, the Leachate ESD, was issued by EPA on August 13, 1997. The Leachate ESD gives the PRPs the option of discharging extracted leachate, with or without treatment, to a sanitary sewer connected to the local wastewater treatment plant. One effect of the Leachate ESD is the deferral of the design and construction of any on-site leachate treatment system until after resolution of whether all permits and approvals can be issued for discharge to the publicly owned treatment works.

Consent decree negotiations for construction of the designed remedy between EPA and the PRPs were unsuccessful. Therefore, on May 6, 1998, EPA issued two unilateral administrative orders. One order requires the PRPs to implement the remedy as described in the approved final design plans, and the other requires the PRPs to implement the groundwater portions of the remedy, if the groundwater study required by the ESD indicates that this is necessary.

Mobilization for construction began in October 1998. No significant problems were encountered during construction. EPA and Ohio EPA conducted a final inspection on January 27, 2000 which concluded that construction activities were complete. According to the February 25, 2000 Preliminary Close Out Report, EPA determined that the remedial activities were completed according to the ROD design specifications.

The cost estimate to implement the remedial action described in the ROD was $3.8 million. Actual cost data from the PRPs is not available.

## System Operations/Operations and Maintenance

The active landfill gas and leachate extraction systems have been operational since January 2000. The locations of the extraction wells, the leachate collection tank, and flare station are shown on Figure 2. The system consists of 26 dual gas and leachate extraction wells, and three wells constructed for leachate extraction only. The landfill leachate and condensate from the gas extraction system are collected in a 20,000 gallon tank. The leachate is currently being trucked off-site for treatment. Landfill gas is collected under vacuum from the extraction wells and directed to the flare station for thermal treatment. Monitoring wells have been installed to monitor groundwater quality and water levels. The groundwater monitoring wells are shown in Figure 2.

Long term operations and maintenance (O&M) of the remedial action components at the Site is being conducted by Waste Management of Ohio, Inc.(WMO). O&M activities for the Site are required to be conducted for a period of 30 years following completion of closure construction. The remedy is currently in the fourth year of O&M. O&M activities at the Site include the following tasks:

-Semiannual groundwater quality and water level monitoring and maintenance of the groundwater monitoring wells;
-Leachate/condensate and landfill gas extraction and maintenance of the extraction wells and collection systems including the flare station;

-Leachate quality and level monitoring, and landfill gas monitoring;
-Site maintenance including regular inspections, fence repair, grass cutting and reseeding, maintenance of storm water drainage channels, cap maintenance, and maintenance of site security.

Problems encountered during O&M have included minor erosion and lack of adequate vegetation on top of the landfill, leachate collection system shutdowns due to a full leachate storage tank, excessive water in air supply lines for the leachate removal system due to air supply with greater than designed moisture content, blower/flare system not operating due to a faulty actuated valve, knockout sump pump failure, and extensive damage to the flare blower caused by a screw that came loose and entered the blower. These problems were all addressed through corrective actions.

The estimate for O&M costs was $4.4 million over a 30-year period. Actual O&M costs from the PRPs are not available. The remedy is functioning as designed and all components of the remedy appear to be functioning normally.

## V. Progress Since the Last Five-Year Review

This is the first five-year review for the Site.

## VI. Five-Year Review Process

### Administrative Components

The Powell Road Landfill five-year review was prepared by Scott Glum, Ohio EPA Site Coordinator, and Anthony Rutter, EPA Remedial Project Manager. The five-year review consisted of a review of relevant documents and monitoring data, discussions with Waste Management of Ohio, Inc. and its technical representatives, and a site inspection.

### Community Involvement

A public notice was placed in the Dayton Daily News announcing that a five-year review was to be performed for the Site. Notice of the completed five-year review will be placed in the Dayton Daily News and the final report will be available at the information repository. The information repositories for the Site are located at Dayton Public Library (215 E. Third Street, Dayton, Ohio 45402) and Huber Heights Public Library (6363 Brandt Pike, Huber Heights, Ohio 45424).

### Document Review

The five-year review consisted of a review of relevant documents including the RI and FS reports, the ROD, the Remedial Action Report, the Preliminary Close Out Report, O&M monthly and annual reports, O&M sampling submittals, and the Report of Groundwater Study. The list

of documents reviewed is provided in Attachment 1.

The standards identified in the 1993 ROD as applicable or relevant and appropriate requirements (ARARs) were reviewed for changes that could affect protectiveness. There were no significant changes in these ARARs.

Chemical-Specific ARARs

Chemical-Specific ARARs regulate the release to the environment of specific substances having certain chemical characteristics. There have been no significant changes in the chemical-specific ARARs listed in the 1993 ROD. However, the SDWA requires EPA to revise the existing 50 parts per billion (ppb) Maximum Contaminant Level (MCL) for arsenic in drinking water. On January 22, 2001 EPA adopted a new standard and public water systems must comply with the 10 ppb MCL beginning January 23, 2006. This will be evaluated during the next five-year review. Maximum Contaminant Levels promulgated under the Safe Drinking Water Act (SDWA) are not applicable to the Site, but are relevant and appropriate since the aquifer underlying the Site is a sole-source aquifer. The point of compliance for these Federal drinking water standards is at the boundary of the landfilled waste and throughout the contaminated ground water plume associated with the Site. Ohio EPA standards for drinking water are also relevant and appropriate. Ground water monitoring will continue during O&M.

Ambient Water Quality Criteria and State Surface Water Standards are also relevant and appropriate. Contaminated soils have been consolidated under the landfill cap, preventing the migration of contaminated soils into surface water. There is currently no discharge to the Great Miami River since extracted leachate is being hauled off-site for treatment.

Clean Air Act requirements, including the total suspended particulates (TSP) standard for air discharges, are applicable. The extracted landfill gas is treated by a destructive flare and contaminated soils have been placed beneath the cap, thereby preventing fugitive dust, particulates, and VOC emissions.

Location-Specific ARARs

Location-Specific ARARs are those requirements that relate to the geographic position of the Site. There have been no significant changes in these ARARs since the 1993 ROD.

Clean Water Act Section 404 , which regulates the discharge of dredge and fill materials to waters of the United States, is applicable since wetlands are located on the Site. Wetland Management Executive Order 11990, which requires federal agencies to avoid adverse impacts associated with the destruction or modification of wetlands, is also applicable.

RCRA location standards, 40 CFR part 264.18, specify that a facility located in a flood plain must be designed, constructed, operated, and maintained to prevent washout of hazardous wastes by a 100-year flood. Floodplain Management Executive Order 11988 requires minimization of potential harm to or within flood plains and the avoidance of long and short term adverse impacts associated with the occupancy and modification of flood plains. These requirements are applicable since the Site is located within a flood plain.

Action-Specific ARARs

Action-Specific ARARs are requirements that define acceptable treatment and disposal

procedures for hazardous substances. The remedy is functioning in compliance with all Federal and State of Ohio (Ohio Revised Code (ORC) and Ohio Administrative Code (OAC) ) action-specific ARARs identified in the 1993 ROD. These ARARs include Clean Air Act, OAC, and ORC requirements for excavation of soils on-site and gas collection and treatment; ORC and OAC requirements for leachate removal and treatment; and ORC and OAC requirements for groundwater monitoring. The improved cap was constructed in accordance with the requirements of OAC 3745-27-11. The 1993 ROD identified Clean Water Act, OAC, and ORC requirements for discharge of effluent to a river as applicable to the Site. However, there is currently no discharge to the Great Miami River since extracted leachate is being hauled off-site for treatment.

Toxic Substances Control Act Standards for Polychlorinated Biphenyls (PCBs) (40 CFR Part 761) is applicable to the Site since a portion of the contaminated soils excavated and consolidated on the Site had PCB levels above 50 parts per million.

Clean Air Act (40 CFR Part 52) governs the approval and promulgation of implementation plans for meeting regional air quality standards. Clean Air Act Air Quality and Emission Limitations (Clean Air Act Section 110) relate to air quality and emission limitations. These requirements are applicable to the Site since contaminated soils have been excavated and consolidated beneath the cap and landfill gas is being collected and treated with a flare.

## Data Review

The components of the remedy are functioning as designed. The improved landfill cap is inspected quarterly and is in good condition, preventing direct contact with contaminated materials and greatly reducing water flow through the waste. The surface water drainage control and flood protection systems are also inspected quarterly and are functioning as designed.

The landfill gas management system is effectively removing and combusting landfill gas. Based upon quarterly monitoring of permanent gas probes GP-01 thru GP-06, migration of combustible concentrations of methane gas has not occurred since the landfill gas management system became operational. Methane detections at these probes have been insignificant, ranging from 0.0 to 0.2 percent methane. Combustible gas monitors installed at the residence at 4010 Powell Road and the Compressor Building have not alarmed at any time.

The leachate extraction system is effectively maintaining and reducing leachate levels within the landfill. The system removed nearly 1.1 million gallons of leachate from the landfill between January 2000 and July 2003. All leachate is trucked off-site to the United Wastewater Treatment Facility for treatment. The average quantity hauled per month is about 26,500 gallons. Samples of landfill leachate and condensate have been collected and analyzed ten times since January 2000. The compounds detected in the leachate have been fairly consistent, with detected concentrations of individual compounds showing some variation. Leachate quality data is presented in Attachment 2.

The groundwater monitoring system has been maintained and groundwater samples have been collected in accordance with the Groundwater Monitoring Plan and the Work Plan for the

Groundwater Study. The groundwater monitoring wells are shown in Figure 2. Based on water level data, groundwater flow in the shallow zone and primary aquifer is primarily to the south. During high flow conditions in the Great Miami River, groundwater flow shifts slightly to the southeast. For the most part, VOC data collected since the RI show a decrease in contamination in the shallow groundwater zone as well as a reduction in the number of compounds detected and in the concentrations of individual compounds. There is no evidence of contaminant migration from the shallow zone to the primary aquifer or to the south of the Great Miami River. Contaminant concentrations in the primary aquifer in the vicinity of the Site are at low levels. Groundwater monitoring continues to indicate hat the plume is dissipating.

The chemicals of concern for groundwater listed in the ROD are antimony, benzo(a)anthracene, chrysene, vinyl chloride, arsenic, and beryllium. Antimony, benzo(a)anthracene, and chrysene have never been detected in groundwater samples from the Site, and beryllium has not been detected since December 1988. In November 2002, vinyl chloride was detected at 3.1 µg/L at MW20A along the southern property boundary. This concentration is above the MCL of 2 µg/L, but below the 10E-04 risk based ROD cleanup level of 4 µg/L. Vinyl chloride is the only VOC that exceeds a MCL in groundwater at the Site. In November 2002, the risk based cleanup level for arsenic was exceeded at shallow zone wells MW04AR (49 µg/L), MW16A (6.9 µg/L), MW19A (15 µg/L), and MW20A (13 µg/L). The risk based cleanup level for arsenic is 4 µg/L, which is below the normally occurring arsenic levels in the vicinity of the Site. Detections of arsenic at MW04AR and MW16A have declined since completion of the containment components of the remedy in January 2000. A comparison of ROD cleanup levels with November 2002 groundwater quality data is presented in Attachment 3.

The semivolatile compound 1,4-dioxane has been detected in on-site shallow zone groundwater since May 2001. To date, detections of 1,4-dioxane do not show an increasing trend. The highest concentration of 1,4-dioxane detected was 110 µg/L at MW04AR in November 2002, below the 10E-04 risk level of 300 µg/L. There is no MCL for 1,4-dioxane and no cleanup level or ARAR is specified in the ROD. 1,4-Dioxane is generally not biodegradable and is persistent in groundwater.

The ground-water study required by EPA to evaluate whether the deferred groundwater extraction and treatment components of the remedy are necessary has been completed. The results of this study indicate that volatile organic compound concentrations in the shallow zone groundwater and in the primary aquifer continue to decrease, and that aerobic and anaerobic biodegradation is occurring. The containment components of the remedy appear to be effective. Therefore, there is no indication that the groundwater extraction and treatment components of the remedy will be necessary.

## Site Inspection

A site inspection was conducted on June 30, 2003 as part of this five-year review. The inspection was conducted by Scott Glum, Site Coordinator for Ohio EPA, Robin Jones, Project Manager for Waste Management of Ohio, Inc., and Steve Champa, Hydrogeologist for Eagon and Associates.

The purpose of the site inspection was to assess the protectiveness of the remedy, including

the integrity of the landfill cap, the landfill gas collection and destruction system, the leachate collection system, the condition of site perimeter fencing, and the condition of O&M monitoring locations.

The landfill cap and vegetation appeared to be in good condition. Ditch lines, berms, and spillways were also in good condition, although excessive vegetation and tree saplings were present in some drainage ditches along the landfill perimeter. The site fencing was intact. Excessive vegetation was observed encroaching the fence in some areas. The site signs were intact.

The flare was inoperative at the time of the inspection due to a mechanical problem with the blower. The flare problem was in the process of being addressed by Waste Management's contractor.

## VII. Technical Assessment

### Question A: Is the remedy functioning as intended by the decision documents?

The review of documents, review of O&M data, and the results of the site inspection indicate that the remedy is functioning as intended by the ROD. The remedy eliminates the principal threat posed by the Site by preventing direct contact with contaminated materials, venting and destroying landfill gases, greatly reducing water flow thru the waste, and extracting and treating leachate from the landfill. The performance of the remedy could be improved and costs reduced by discharging leachate directly to a wastewater treatment plant (WWTP) for treatment rather than the current practice of having leachate hauled by tanker truck to an off-site treatment facility. Discussions are ongoing between Waste Management and the Tri-Cities North Regional Wastewater Authority regarding this issue.

The ground-water study required by EPA to evaluate whether the deferred groundwater extraction and treatment components of the remedy are necessary has been completed. The results of this study indicate that volatile organic compound concentrations in the shallow zone groundwater and in the primary aquifer continue to decrease, and that aerobic and anaerobic biodegradation is occurring. There is no evidence of contaminant migration from the shallow zone to the primary aquifer or to the south of the Great Miami River. The containment components of the remedy appear to be effective. Therefore, there is no indication that the groundwater extraction and treatment components of the remedy will be necessary.

### Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of remedy selection still valid?

There have been no physical changes at the Site that would affect the protectiveness of the remedy.

There have been no changes in the standards identified in the ROD that effect the protectiveness of the remedy. However, the SDWA requires EPA to revise the existing 50 ppb MCL for arsenic in drinking water. On January 22, 2001 EPA adopted a new standard and public water systems must comply with the 10 ppb MCL beginning January 23, 2006. The

impact of the new MCL for arsenic will be evaluated during the next five-year review.

Land use has not changed near the landfill. No new exposure pathways or receptors have been identified. The remedy is progressing as expected.

### Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No additional information has come to light which would call into question the protectiveness of the remedy in the short term. However, it is worth noting that 1,4-dioxane has been detected in on-site shallow zone groundwater since May 2001. To date, detections of 1,4-dioxane do not show an increasing trend, and it has not been detected in the primary aquifer. The highest concentration of 1,4-dioxane detected was 110 µg/L in November 2002, below the 10E-04 risk level of 300 µg/L. There is no MCL for 1,4-dioxane and no cleanup level or ARAR is specified in the ROD.
1,4-Dioxane is more mobile than other site related contaminants, is generally not biodegradable and is persistent in groundwater. Long term groundwater monitoring will enable 1,4-dioxane to be monitored to determine any potential threat to protectiveness of the remedy over the long term.

### Technical Assessment Summary

According to the data reviewed and the site inspection, the remedy is functioning as intended by the ROD. There have been no changes in the physical conditions of the Site that would affect the protectiveness of the remedy. Current groundwater monitoring data indicate that the remedy is functioning as required to achieve groundwater clean-up goals. There is no indication that the groundwater extraction and treatment components of the remedy will be necessary.

## VIII. Issues

According to the data reviewed and the site inspection, the remedy is functioning as intended. No significant issues were identified.

## IX. Recommendations and Follow-up Actions

The recommendation resulting from this five-year review is to continue operation and maintenance of the current remedy components. Based upon the results of the Ground-Water Study, there is no indication that the groundwater extraction and treatment components of the remedy will be necessary. O&M groundwater monitoring should continue. It is recommended that discussions between Waste Management and TriCities North Regional Wastewater Authority continue regarding discharge of leachate to the WWTP for treatment. This would be more efficient than the current practice of having leachate hauled by tanker truck to an off-site

treatment facility. The excessive vegetation identified during the site inspection will be removed by Waste Management, and these areas will continue to be inspected for excessive vegetation.

## X. Protectiveness Statement

The site remedy is protective of human health and the environment. The remedy eliminates the principal threat posed by the Site by preventing direct contact with contaminated materials, venting and destroying landfill gases, greatly reducing water flow thru the waste, and extracting and treating leachate from the landfill. Long term protectiveness of the remedy will be verified through continued groundwater monitoring.

## XI. Next Review

The next five-year review for the Powell Road Landfill is required by September 2008, five years from the date of this review.

FIGURE 1. LOCATION MAP

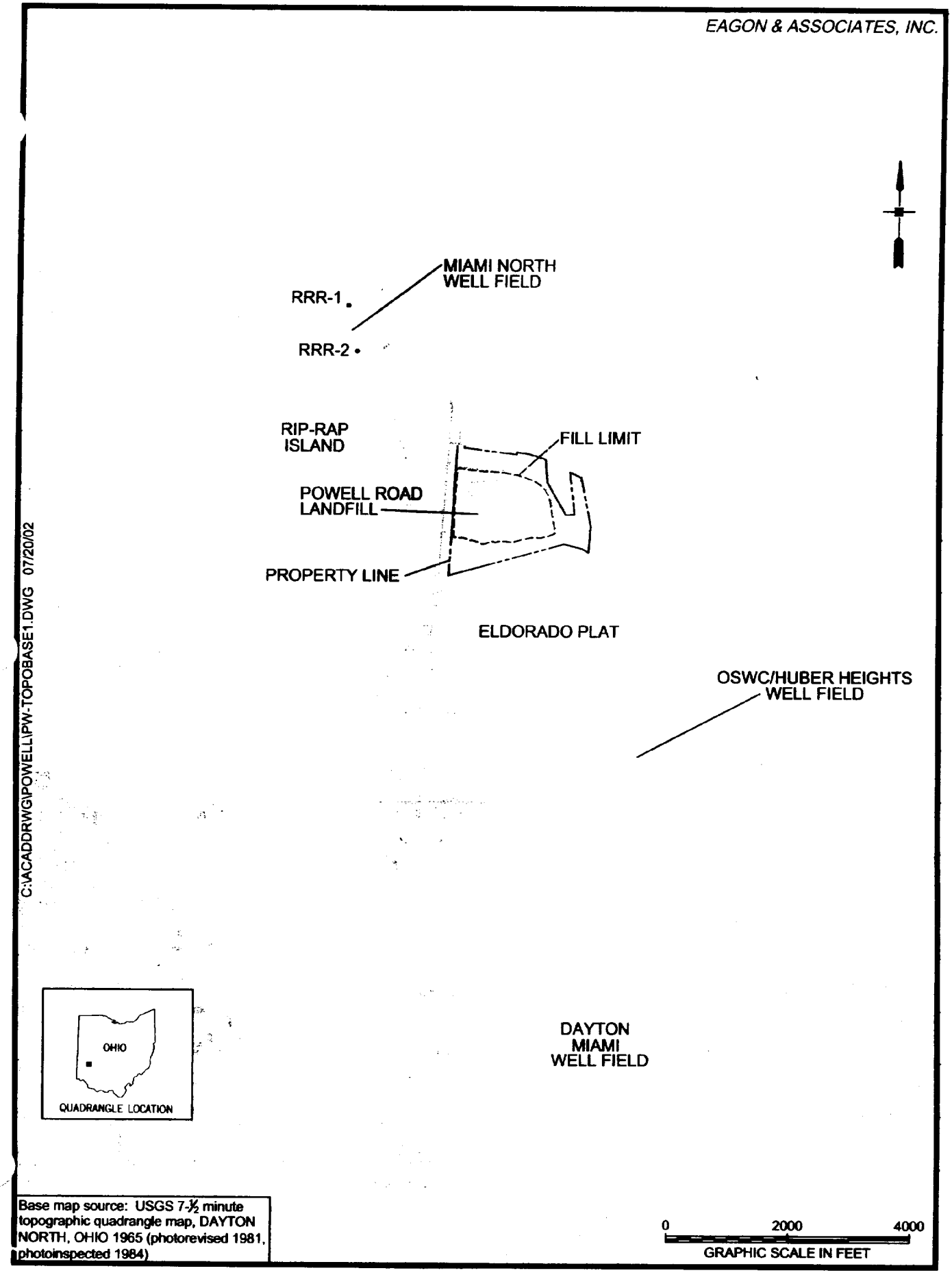


FIGURE E-1. GENERAL LOCATION MAP

FIGURE 2. SITE MAP

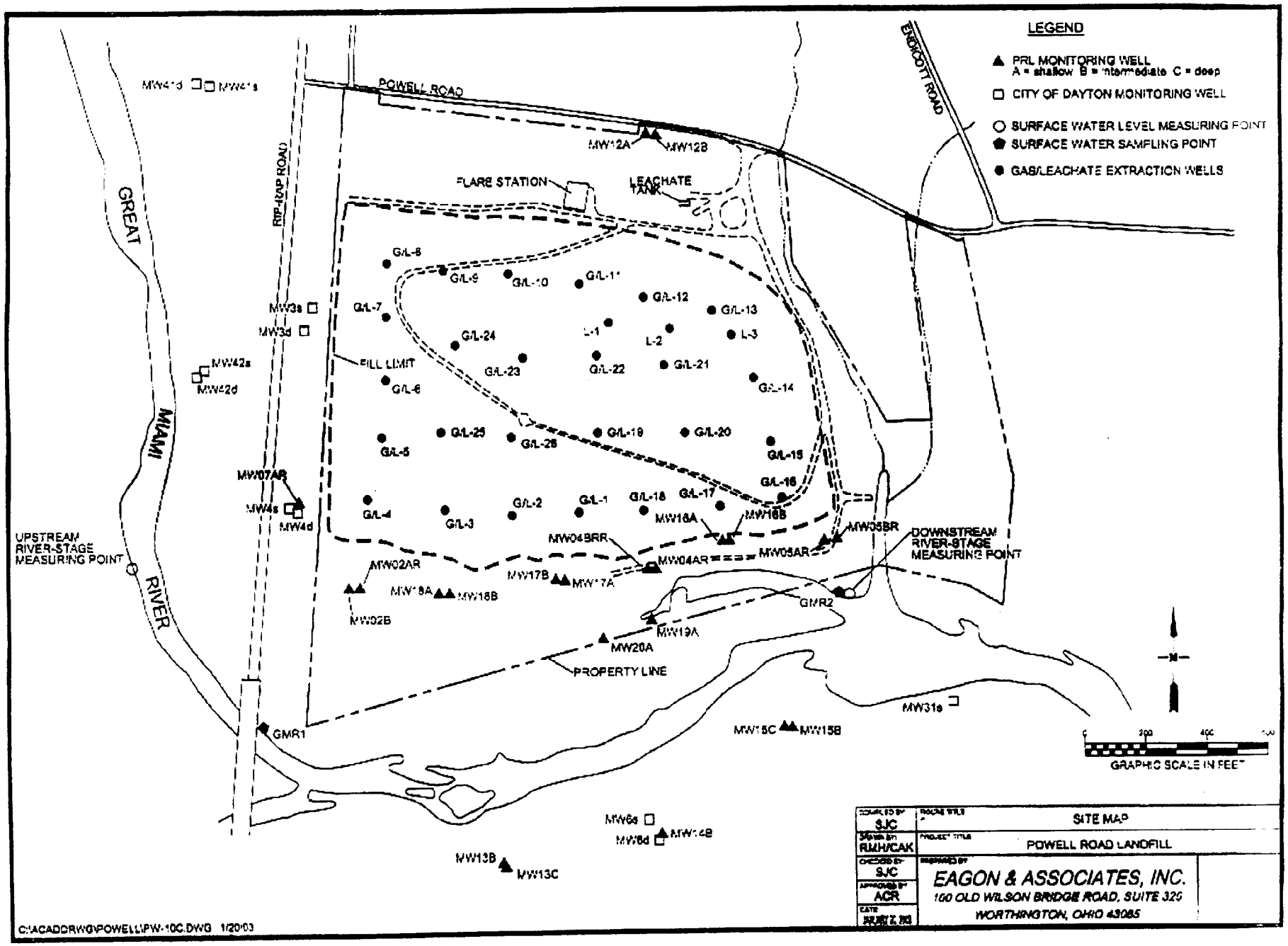


FIGURE 2. SITE MAP

## Attachment 1

## List of Documents Reviewed

United States Environmental Protection Agency, "Record of Decision, Powell Road Landfill", September 30, 1993.

Eagon & Associates, Inc., "Report of Ground-Water Study, Powell Road Landfill, Montgomery County, Ohio", January 2003.

Eagon & Associates, Inc., "November 2002 Sampling Submittal, Powell Road Landfill", February 2003.

Earth Tech, Inc., "Operation and Maintenance Plan, Powell Road Landfill", April 2002.

Earth Tech, Inc., "2000 Annual Report, Operation, Maintenance, and Monitoring, Powell Road Landfill", March 2001.

Earth Tech, Inc., "2001 Annual Report, Operation, Maintenance, and Monitoring, Powell Road Landfill", April 2002.

Earth Tech, Inc., "2002 Annual Report, Operation, Maintenance, and Monitoring, Powell Road Landfill", April 2003.

Dames & Moore, et al., "Remedial Investigation Report, Powell Road Landfill", February 1992.

Dames & Moore, "Feasibility Study Report, Powell Road Landfill", December 1992.

SCS Engineers, "Remedial Action Report, Powell Road Landfill, Montgomery County, Ohio", March 2000.

## Attachment 2

## Parameters Detected in Leachate

Attachment 2

## TABLE 5-8.
## PARAMETERS DETECTED IN LEACHATE DURING O & M MONITORING
## POWELL ROAD LANDFILL

| Parameter | 02/17/2000 | 03/02/2000 | 03/13/2000 | 04/10/2000 | 05/01/00 | 08/15/00 | 11/13/00 | 02/19/01 | 05/21/01 | 5/6/02 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Inorganics and Metals (mg/l)** | | | | | | | | | | |
| Alkalinity | | | | | | 4940 | 3790 | 4160 | 2520 | 2420 |
| BOD - Five Day | 176 | 262 | 252 | <374 | 207 | 156 | 143 | 140 | 70.8 | 56.9 |
| Chloride | 1870 | 2090 | 2130 | 865 | <0.5 R | 1690 | 678 | 1020 | 937 | 813 |
| COD | 2200 | 2520 | 2560 | 908 | 1720 | 1520 | 1540 | 1660 | 852 | 650 |
| Cyanide, Total | <0.005 | <0.005 | 0.130 | <0.005 | <0.02 | <0.020 | <0.020 | <0.020 | <0.020 | |
| Fats, Oils, and Grease | <5 | 12 | 153 | <5 | <5.0 | <5.0 | 6.0 | <5.0 | <5.0 | 6.2 |
| Fluoride | | | | | <0.05 | <0.050 | <0.050 | <0.050 | <0.050 | |
| Nitrogen, Ammonia | 700 | 820 | 890 | 260 | 704 | 901 | 1120 | 582 | 368 | 235 |
| Nitrogen, Nitrate + Nitrite | | 0.03 | <0.02 | 0.03 | <0.05 | <2.8 | <1.0 | <0.50 | <0.050 | <0.050 |
| Phosphorus | | 5.79 | 4.36 | 1.62 | 2.8 | 2.9 | 3.7 | 2.6 | 1.6 | 1.5 |
| pH, (Lab) measured in S.U. | 7.53 | 7.4 | 7.35 | 6.92 | 6.55 | 7.68 | 7.72 | 7.45 | 7.32 | 7.40 |
| Solids, Total Dissolved | 6060 | 4300 | 6250 | 2890 | 5150 | 5900 | 5950 | 5780 | 3150 | 3110 |
| Solids, Suspended | 9 | 8 | 11 | 39 | 72.0 | 42.5 | 8.5 | 11.0 | 44.0 | 18.0 |
| Sulfate | 60 | 84 | 75 | 106 | 92.9 | 101 | 128 | 122 | 145 | 116 |
| Sulfide | <2 | 14.7 | 15.9 | <2 | 2.0 | 4.3 | <2.0 | <2.0 | 2.4 | 2.1 |
| Total Organic Carbon (TOC) | | 673 | 725 | 290 | 483 | 527 | 567 | 511 | 246 | 194 |
| Aluminum | 0.33 | .252 | 0.33 | 0.12 | 0.41 | 0.38 | 0.30 | 0.29 | <0.10 | <0.10 |
| Antimony | <0.01 | 0.0023 | <0.0050 | <0.005 | <0.006 | <0.0063 | <0.0063 | <0.006 | <0.006 | <0.003 |
| Arsenic | 0.009 | <0.025 | 0.0019 | <0.005 | 0.046 | 0.028 | 0.029 | 0.036 | 0.014 | 0.015 |
| Barium | 0.299 | 0.218 | 0.267 | 0.253 | 0.35 | 0.39 | 0.37 | 0.35 | 0.27 | 0.44 |
| Beryllium | <0.0020 | <0.0020 | <0.020 | <0.0020 | <0.004 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | |
| Cadmium | <0.0020 | <0.0020 | <0.0050 | <0.0050 | 0.0026 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.001 |
| Calcium | 56 | 52 | 59.1 | 118 | 88.7 | 71.4 | 68.6 | 65.8 | 102 | 140 |
| Chromium | 0.0529 | 0.0481 | 0.0688 | 0.0231 | 0.062 | 0.068 | 0.077 | 0.080 | 0.035 | 0.021 |
| Cobalt | 0.0274 | 0.0221 | 0.0286 | 0.0201 | <0.05 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| Copper | 0.0075 | <0.015 | 0.0222 | <0.010 | <0.025 | <0.025 | <0.025 | <0.025 | <0.025 | <0.025 |
| Iron | 5.39 | 7.3 | 7.31 | 17.5 | 11.9 | 3.2 | 1.8 | 6.9 | 6.2 | 7.3 |
| Lead | 0.0212 | 0.0161 | 0.0202 | 0.0104 | 0.023 | 0.014 | 0.018 | 0.022 | 0.0067 | 0.01 |
| Magnesium | 126 | 111 | 145 | 64.3 | 115 | 116 | 128 | 118 | 78.3 | 98.3 |
| Manganese | 0.122 | 0.092 | 0.095 | 0.286 | 0.18 | 0.12 | 0.11 | 0.092 | 0.23 | 0.25 |
| Mercury | <0.0002 | <0.0002 | <0.0002 | <0.0002 | <0.0002 | <0.00020 | <0.00020 | <0.00020 | <0.00020 | <0.0002 |
| Nickel | 0.140 | 0.114 | 0.156 | 0.126 | 0.16 | 0.15 | 0.16 | 0.17 | 0.085 | 0.062 |
| Potassium | 647 | 564 | 836 | 259 | 401 | 955 | 628 | 821 | 322 | 301 |
| Selenium | <0.050 | <0.0250 | <0.0050 | <0.010 | <0.005 | <0.0066 | <0.0066 | <0.0050 | <0.0050 | <0.005 |
| Silver | <0.005 | <0.001 | <0.005 | <0.0025 | <0.003 | <0.0030 | <0.0030 | <0.0030 | <0.0030 | <0.003 |
| Sodium | 1400 | 1170 | 1640 | 512 | 1720 | 2240 | 1780 | 1760 | 693 | 642 |
| Thallium | <0.0020 | <0.0020 | <0.0050 | <0.0050 | <0.002 | <0.0020 | <0.0020 | <0.0020 | <0.0020 | |
| Tin | <2.0 | <2.0 | <2.0 | <2.0 | 0.094 | 0.085 | 0.093 | 0.11 | <0.010 | 0.021 |
| Vanadium | <0.050 | <0.050 | <0.050 | <0.050 | <0.05 | <0.050 | <0.050 | <0.050 | <0.050 | |
| Zinc | 0.181 | 0.120 | 0.164 | 0.0964 | 0.16 | 0.088 | 0.096 | 0.10 | 0.052 | 0.055 |

attachment 2

**TABLE 5-8.**

**PARAMETERS DETECTED IN LEACHATE DURING O & M MONITORING**

**POWELL ROAD LANDFILL**

| Parameter | 02/17/2000 | 03/02/2000 | 03/13/2000 | 04/10/2000 | 05/01/00 | 08/15/00 | 11/13/00 | 02/19/01 | 05/21/01 | 5/6/02 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Detected Volatile Organic Compounds (µg/l)** | | | | | | | | | | |
| Acetone | 1280 | 3280 | 861 | 630 | 2700 | 470 | <100 | 1100 | 470 | 1400 |
| Benzene | <10 | 10.2 | <10 | <20 | <8 | <3 | <2 | <2 | <2 | <2 |
| 2-Butanone (MEK) | 1080 | 1530 | 1110 | 849 | 3100 | 730 | 590 | 1300 | 540 | 1600 |
| Carbon Disulfide | <10 | <10 | <10 | <20 | <8 | <5 | 7 | <5 | <5 | <5 |
| Chlorobenzene | <10 | 16.4 | <10 | <20 | <7 | <3 | <2 | 3 | <2 | 4 |
| Chloroethane | <50 | <50 | <50 | <100 | <8 | <5 | <5 | <5 | <5 | 6 |
| cis-1,2-dichloroethene | | 24.2 | 13.7 | <20 | 17 | 7 | <5 | <5 | <5 | 7 |
| 1,4-Dichlorobenzene | <100 | <100 | <100 | <100 | 14 | 6 | <2 | 9 | 4 | 18 |
| Ethylbenzene | 59.3 | 127 | 76.9 | 38.4 | 20 | 7 | <2 | <2 | 8 | 21 |
| 4-Methyl-2-pentanone (MIK) | 143 | 283 | 130 | <250 | 190 | 86 | 120 | 120 | <50 | 82 |
| Methylene chloride | <50 | <50 | <50 | <100 | 75 | <5 | <5 | 32 | <5 | 9 |
| Toluene | 103 | 188 | 124 | 77.4 | 52 | 14 | 13 | 16 | 14 | 14 |
| Xylenes | 198 | 463 | 278 | 60.0 | 100 | 50 | 39 | 44 | 39 | 120 |
| Vinyl Chloride | <10 | <10 | <10 | <20 | <8 | <3 | <2 | <2 | <2 | 3 |
| **Detected Semi-Volatile Organic Compounds (µg/l)** | | | | | | | | | | |
| 1,4-Dioxane | | | | | 76 | 22 | 320 | 210 | 250 | 810E, 840D |
| Meta & para-methylphenol | <100 | <100 | 128 | <100 | <37 | <10 | <10 | <10 | <10 | 10 |
| bis (2-ethylhexyl) phthalate | <100 | <100 | <100 | <100 | 110 | 29 | 25 | 28 | 13 | <10 |
| **Detected Herbicides (µg/l)** | | | | | | | | | | |
| Silvex (2,4,5-TP) | <5.1 | <5.0 | | 1.52 | 0.24J | 2.2 | 1.3 | 2.9 | 2.5 | <1.0 |
| 2,4-D | <5.1 | <50.3 | | <5.15 | 2.3 | <1 | <1 | <1 | <1.0 | <1.0 |
| **Detected PCBs (µg/l)** | | | | | | | | | | |
| PCB 1242 | <0.2 | <0.2 | <2.0 | <0.2 | 1.2 | 0.61 | 0.51 | <1.0 | <1.0 | <1.0 |

*Note: Samples collected from leachate tank after start-up of leachate extraction system*

*J = estimated value*

## Attachment 3

## Comparison of ROD Cleanup Levels with November 2002 Water-Quality Data

Attachment 3

# TABLE 8-1
# COMPARISON OF ROD CLEANUP LEVELS WITH NOVEMBER 2002 WATER-QUALITY DATA
# POWELL ROAD LANDFILL

| Compound | $10^{-4}$ Cleanup* Level (µg/ℓ) | MCL (µg/ℓ) | MW02AR (µg/ℓ) | MW04AR (µg/ℓ) | MW05AR (µg/ℓ) | MW16A (µg/ℓ) | MW17A (µg/ℓ) | MW18A (µg/ℓ) | MW19A (µg/ℓ) | MW20A (µg/ℓ) |
|---|---|---|---|---|---|---|---|---|---|---|
| Antimony | 15** | 6 | <3 | <3 | <3 | <3 | <3 | <3 | <3 | <3 |
| Benzo(a)anthracene | 0.7 | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Chrysene | 0.7 | -- | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Vinyl Chloride | 4 | 2 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 3.1 |
| Arsenic | 4 | 50 | 1.5 | 49 | 3.3 | 6.9 | 1.5 | 1.4 | 15 | 13 |
| Beryllium | 2 | 4 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |

* Risk based cleanup level from Table 21 of ROD for ingestion of ground water

** Cleanup level for antimony based on Hazard Index = 1, No $10^{-4}$ cleanup level specified